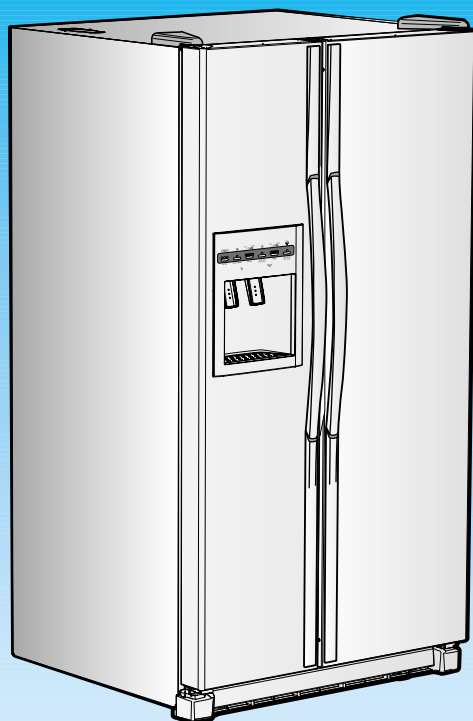


**SAMSUNG**

**SAMSUNG Home Appliance Service**

# ***SERVICE*** ***MANUAL***

**SIDE-BY-SIDE REFRIGERATOR**



**Model:**

**RS2\*3\***

**RS2\*2\***

**RS2\*1\***

**SAM0096**



## **WARNING**

### **IMPORTANT SAFETY NOTICE**

The service guide is for service men with adequate backgrounds of electrical, electronic, and mechanical experience. Any attempt to repair a major appliance may result in personal injury and property damage. The manufacturer or dealer cannot be responsible for the interpretation of this information.

**SAMSUNG ELECTRONICS AMERICA, INC.**

*Technical Service Guide*

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## 1. Safety Instructions on Service

- Unplug the refrigerator before making any repair or any replacement.
  - ⇒ Avoid the electric shock.
- Use the rated components on the replacement.
  - ⇒ Check the correct model number, rated voltage, rated current, operating temperature and so on.
- On repair, be sure that the wires such as harness are bundled tightly and are not exposed by water.
  - ⇒ Bundle wires tightly in order not to be detached by the external force.
- On repair, remove completely dust, particles or other things on housing parts, harness parts, and connectors.
  - ⇒ Cleaning may prevent fire by tracking or short.
- Check if there is any trace indicating the infiltration of water on electrical parts.
  - ⇒ If there is kind of trace, change the related components or do the necessary action such as taping using the insulating tape.
- After repair, check the assembled state of parts.
  - ⇒ It must be in the same assembled state when compared with the state before disassembly.
- Check the surrounding conditions of the installed refrigerator.
  - ⇒ When the refrigerator is located at humid or wet place, or the installed state is unstable, change the location.
- If needed, do the ground.
  - ⇒ Especially, if there is a possibility of the electric leakage, this appliance must be properly grounded.
- Do not allow consumers to use one outlet for several plugs.
- Check whether the power cord is placed under other appliance and so, damaged, worm-out squeezed.
  - ⇒ Repair immediately the defective power plug or outlet.
  - ⇒ Make sure that the power cord is not placed under other appliance or squeezed.
- Do not allow consumers to keep bottles or the likes in the Freezer or to keep foods in unstable position.
- Do not allow consumers to repair the appliance by themselves.
- Do not allow consumers to keep other chemicals except food.
  - ⇒ Medicines and other materials for research ; This appliance will not maintain the precisely constant temperature for them.
  - ⇒ Volatile material(Alcohol, Benzene, Ether, LP gas etc.) : possibility of explosion

## 2. Warranty information

### SAMSUNG REFRIGERATOR

#### LIMITED WARRANTY TO ORIGINAL PURCHASER

This SAMSUNG brand product, as supplied and distributed by Samsung Electronics America, Inc. (SAMSUNG) and delivered new, in the original carton to the original consumer purchaser, is warranted by SAMSUNG against manufacturing defects in materials and workmanship for a limited warranty period of:

**One (1) Year Parts and Labor on Refrigerator**  
**Five (5) Years Parts and Labor on Sealed Refrigeration System Only\***  
(\*Compressor, evaporator, condenser, drier, connecting tubing)

This limited warranty begins on the original date of purchase, and is valid only on products purchased and used in the United States. To receive warranty service, the purchaser must contact SAMSUNG for problem determination and service procedures. Warranty service can only be performed by a SAMSUNG authorized service center. The original dated bill of sale must be presented upon request as proof of purchase to SAMSUNG or SAMSUNG's authorized service center.

SAMSUNG will repair or replace any part found to be defective, at our option and at no charge as stipulated herein, with new or reconditioned parts during the limited warranty period specified above. All replaced parts and products become the property of SAMSUNG and must be returned to SAMSUNG. Replacement parts and products assume the remaining original warranty, or ninety (90) days, whichever is longer.

In-home service will be provided during the warranty labor period subject to availability within the contiguous United States. In-home service is not available in all areas. To receive in-home service, the product must be unobstructed and accessible from floor level to service personnel. If during in-home service repair cannot be completed, it may be necessary to remove, repair and return the product. If in-home service is unavailable, SAMSUNG may elect, at our option, to provide for transportation of our choice to and from a SAMSUNG authorized service center. Otherwise, transportation to and from the SAMSUNG authorized service center is the responsibility of the purchaser.

This limited warranty covers manufacturing defects in materials and workmanship encountered in normal, noncommercial use of this product, and shall not apply to the following, including, but not limited to: damage which occurs in shipment; delivery and installation; applications and uses for which this product was not intended; altered product or serial numbers; cosmetic damage or exterior finish; accidents, abuse, neglect, fire, water, lightning or other acts of nature; use of products, equipment, systems, utilities, services, parts, supplies, accessories, applications, installations, repairs, external plumbing and leaks, external wiring, circuit breakers, fuses or connectors not supplied and authorized by SAMSUNG, or which damage this product or result in service problems; incorrect electrical line voltage, fluctuations and surges; customer adjustments and failure to follow operating instructions, cleaning, maintenance and environmental instructions that are covered and prescribed in the instruction book; loss of food due to spoilage; consumable items including filters and light bulbs.

THERE ARE NO EXPRESS WARRANTIES OTHER THAN THOSE LISTED AND DESCRIBED ABOVE, AND NO WARRANTIES WHETHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, SHALL APPLY AFTER THE EXPRESS WARRANTY PERIODS STATED ABOVE, AND NO OTHER EXPRESS WARRANTY OR GUARANTY GIVEN BY ANY PERSON, FIRM OR CORPORATION WITH RESPECT TO THIS PRODUCT SHALL BE BINDING ON SAMSUNG. SAMSUNG SHALL NOT BE LIABLE FOR LOSS OF REVENUE OR PROFITS, FAILURE TO REALIZE SAVINGS OR OTHER BENEFITS, OR ANY OTHER SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES CAUSED BY THE USE, MISUSE OR INABILITY TO USE THIS PRODUCT, REGARDLESS OF THE LEGAL THEORY ON WHICH THE CLAIM IS BASED, AND EVEN IF SAMSUNG HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. NOR SHALL RECOVERY OF ANY KIND AGAINST SAMSUNG BE GREATER IN AMOUNT THAN THE PURCHASE PRICE OF THE PRODUCT SOLD BY SAMSUNG AND CAUSING THE ALLEGED DAMAGE. WITHOUT LIMITING THE FOREGOING, PURCHASER ASSUMES ALL RISK AND LIABILITY FOR LOSS, DAMAGE OR INJURY TO PURCHASER AND PURCHASER'S PROPERTY AND TO OTHERS AND THEIR PROPERTY ARISING OUT OF THE USE, MISUSE OR INABILITY TO USE THIS PRODUCT SOLD BY SAMSUNG NOT CAUSED DIRECTLY BY THE NEGLIGENCE OF SAMSUNG. THIS LIMITED WARRANTY SHALL NOT EXTEND TO ANYONE OTHER THAN THE ORIGINAL PURCHASER OF THIS PRODUCT, IS NONTRANSFERABLE AND STATES YOUR EXCLUSIVE REMEDY.

Some states do not allow limitations on how long an implied warranty lasts, or the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights, and you may also have other rights, which vary from state to state.

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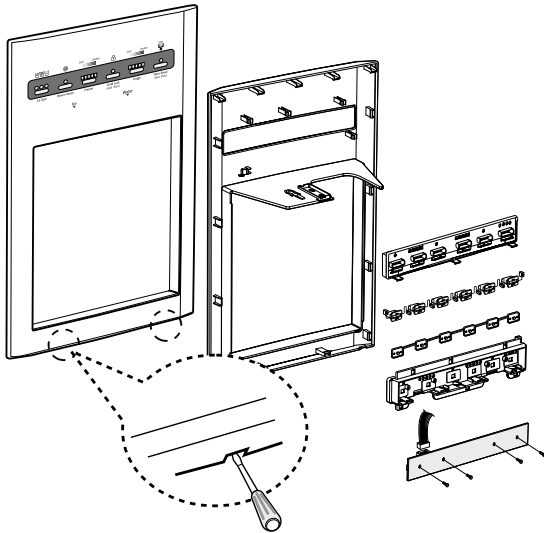
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### 3. Mechanical Disassembly

#### 3-1) Refrigerator Disassembly

##### Control Panel

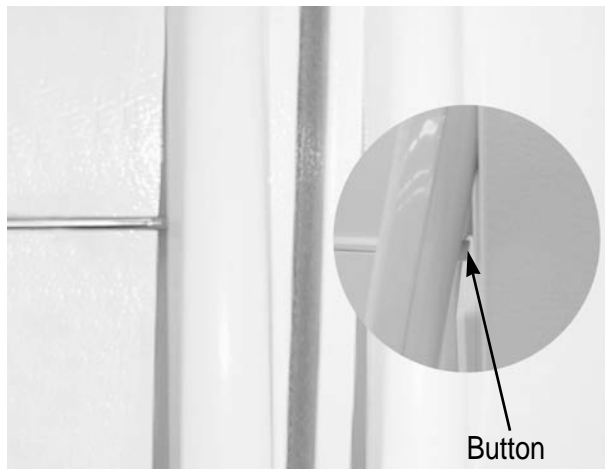
1. Insert a flat-blade screwdriver on the slot as shown, and unlock the tabs.
2. Disconnect the wire connector.



##### Door Handle

The door handles allow access into the refrigerator and freezer. They are front mounted with Phillips head screws.

1. With a small flat-blade screwdriver, press the small button and pull handle cover out.
2. Remove the Phillips screws (5).
3. Lift the handle with an in and upward motion until it disengages the locking tabs. Pull the handle outward to remove it.



##### Door Gasket

The door gasket is a molded gasket set into a channel located in the door liner.

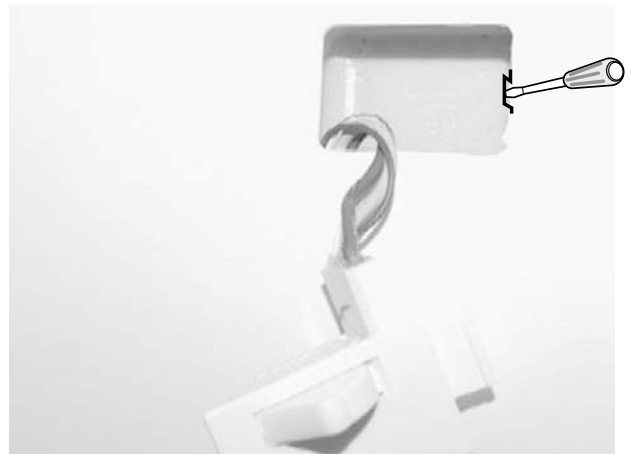
1. Open the door.
2. Grasp the gasket and pull in an outward motion until the molded gasket separates from the door liner.



##### Refrigerator Door Light Switch

The refrigerator has a door light switch located in the upper right corner for the refrigerator.

1. Use a small flat-blade screwdriver to unlock the locking tab and pull the switch out until the wire connector is visible.



## Mechanical Disassembly

### Refrigerator Light

The refrigerator light is located in the upper portion of refrigerator.

1. Pull the tip on the cover.



### Gallon Door Bin

The door bins allow storage of perishable items.

1. Push the bin up and slide it out.



### Tempered Glass Shelf

These shelves allow the storage of larger items and pull out for easy access.

1. Pull the shelf out as far as it goes.
2. Lift it up and remove it.



### Water Filter

The water filter is located in the bottom left-hand corner of the refrigerator. The water filter filters water for the ice maker and the water dispenser.

1. Turn the water filter 1/2 turn counterclockwise and pull it down.
2. To install the filter, align the indication mark (unlock position) and push it up while turning 1/2 turn clockwise until the lock position is aligned. Do not over tighten.



### Plastic Drawers in Refrigerator

Drawers are designed for storage of fruits, vegetables, and deli items. The drawers are located in the lower portion of the refrigerator.

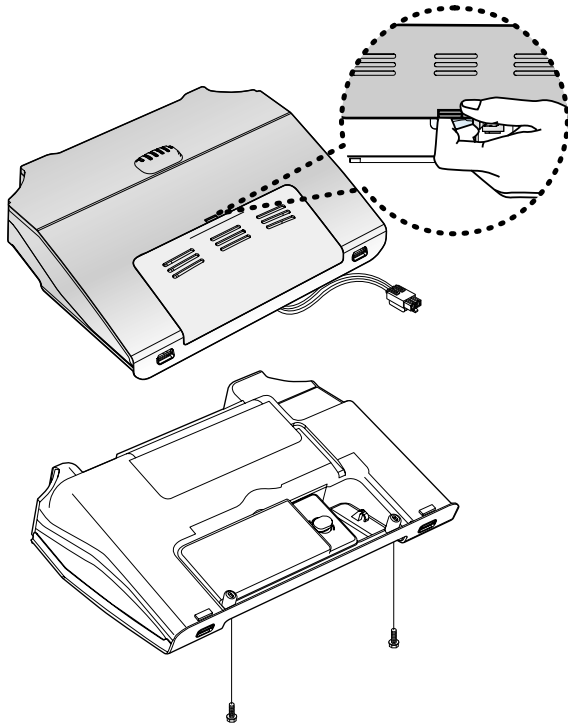
1. Pull out the drawer as far as it goes.
2. Tilt the drawer up and pull it out until it is removed.



## Mechanical Disassembly

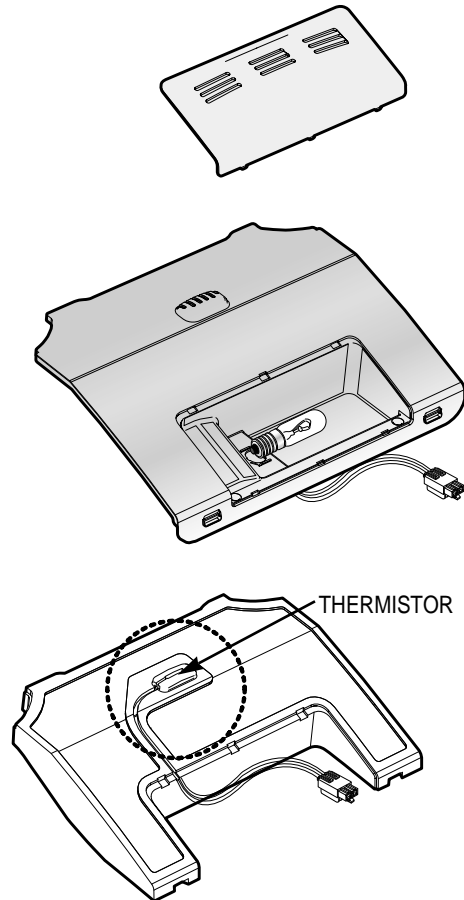
### Damper in the Refrigerator

1. Pull out the screw cap and remove the screw.
2. Remove the lamp cover by unlocking the tabs and pulling the cover down.
3. Remove the screw at the cover damper.
4. Take off sensor and lamp wire connector located on the upper liner.
6. Remove the damper from the refrigerator.



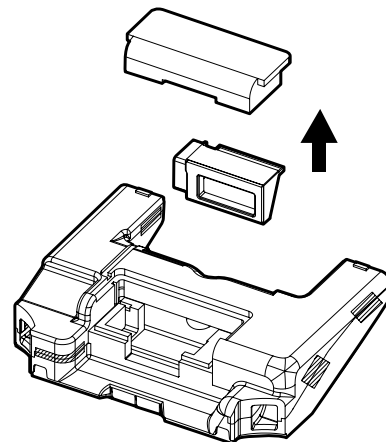
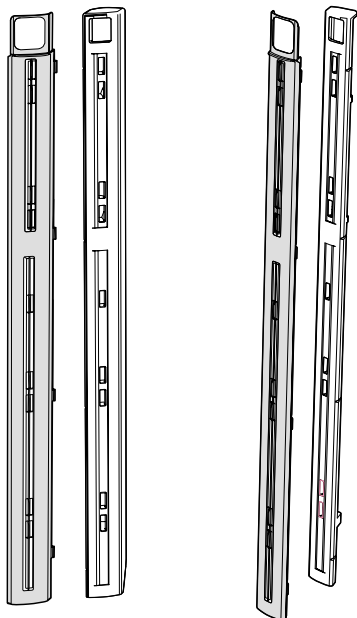
### Refrigerator Thermistor

The refrigerator thermistor is located inside of the upper light cover of the refrigerator.



### Twin cool in the Refrigerator

1. Pull out the Twin cool by unlocking the hooks.



## Mechanical Disassembly

### 3-2) Freezer Disassembly

#### Door Bin in Freezer

The door bins allow storage of perishable items.

1. Push the bin up and slide it out.



#### Freezer Shelf

The shelves slide out for easy access for frozen items.

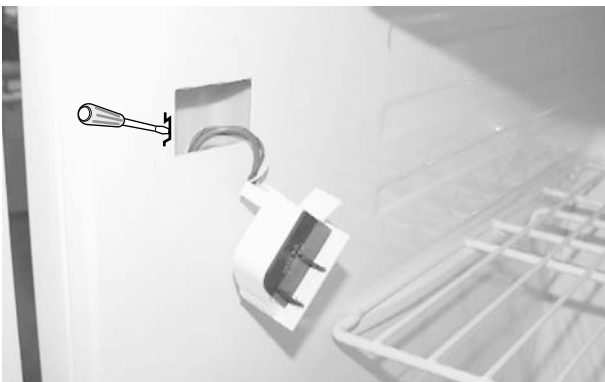
1. Slide the shelf out until it reaches its stop.
2. Tilt down and slide it out of the compartment.



#### Freezer Door Light Switch

This switch is located in the left-hand portion of the freezer and sends a signal to the processor.

1. With a small flat-blade screwdriver, unlock the locking tabs and pull the switch out until the wire connector is visible.
2. Disconnect the wire connector and remove the switch.



#### Plastic (Wire) Drawer in Freezer

Drawers are designed for storage of meat and dry foods. The drawers are located in the lower portion of the freezer.

1. Pull out the drawer as far as it goes.
2. Tilt the drawer up and pull it out until it is removed.

## Mechanical Disassembly

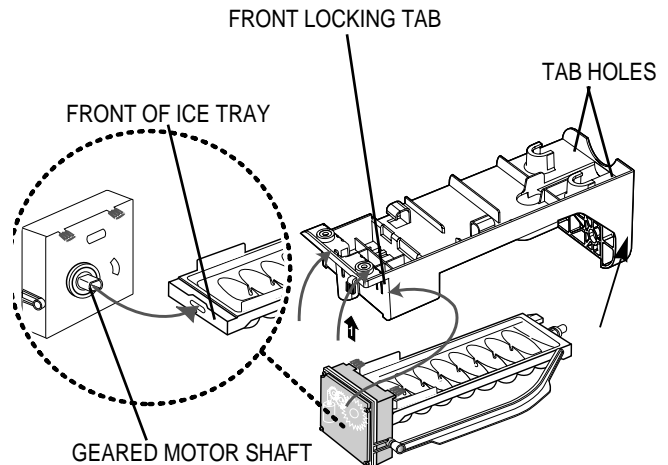
### Ice Dispenser & Ice Maker

The ice dispenser is located in the upper portion of the freezer. This assembly stores ice made by the icemaker and dispenses ice.

1. Lift the ice bucket up ① and slide out the ice dispenser assembly ②.

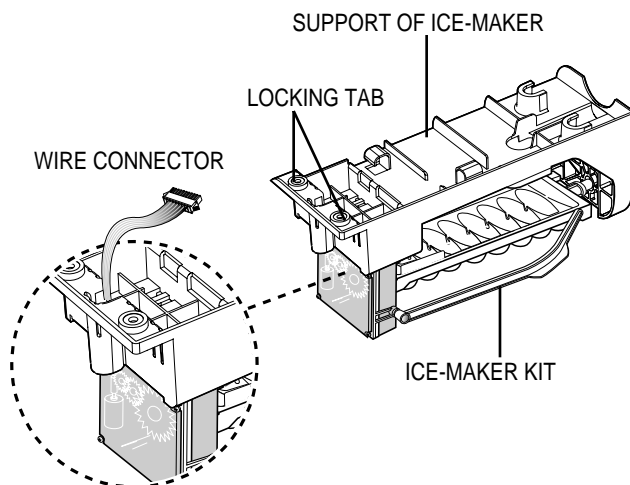


5. Tighten the screws (2) of the ice maker support.



The ice maker is located inside of the ice dispenser assembly.

1. Remove ice maker support screws (2), and slide out.
2. Disconnect the ice maker wire connector.
3. Unlock the locking tabs to separate the ice maker kit.



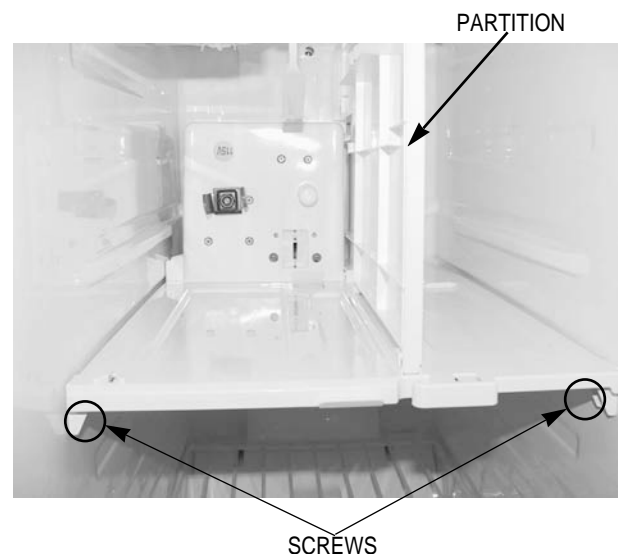
In order to assemble the icemaker kit.

1. Assemble the geared motor shaft and the front of ice tray.
2. Lift the front locking tab and assemble the ice maker kit.
3. Connect the ice maker wire connector.
4. Match the tab holes and tabs(2) located on the

### Auger Motor Case

This shelf is designed to support the ice maker & ice dispensed and Xtra Space™.

1. Remove the Xtra Space™ cover to push it down and pull front.
2. Slide the partition out.
3. Remove the screws (2) on the bottom front of the case.
4. Slide out the case while disconnecting the wire connect.



## Mechanical Disassembly

### Freezer Light

The freezer light is located in the bottom of the auger motor case. The light is covered by an opaque cover.

1. Remove the screw and the light cover.



### Evaporator Fan Motor

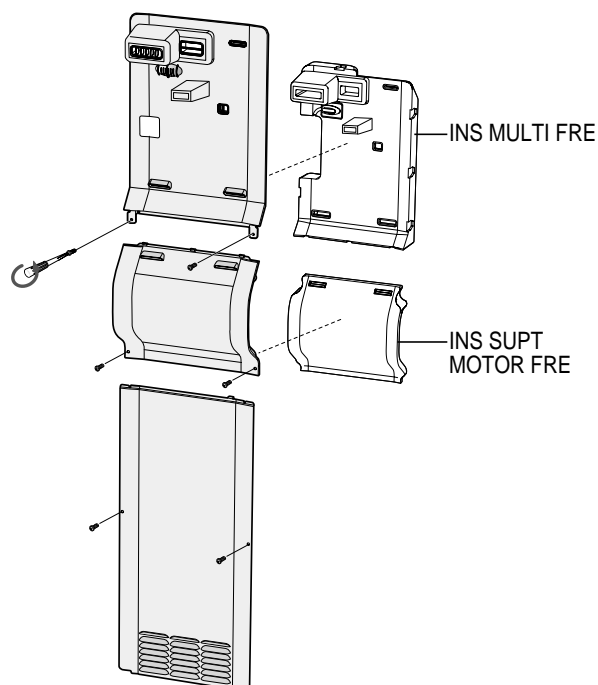
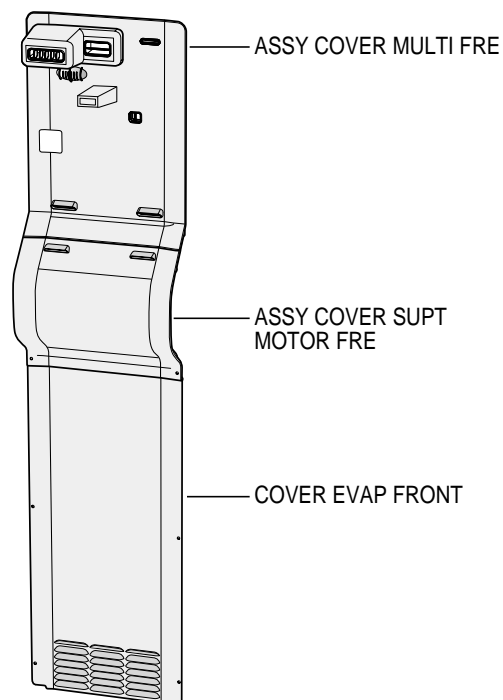
The evaporator fan is located in the middle rear of refrigerator. This fan circulates cold air in the refrigerator.

1. Remove the fan spring, and then remove fan and protector motor.
2. Remove screw located at the four corners of the fan bracket.
3. Take the fan motor assembly off.



### Evaporator Cover in Freezer

1. Remove screw (6).
2. Remove the assy cover multi fre.
3. Remove the assy cover supt motor fre.
4. Remove screw (2).
5. Remove the cover evap front.
6. Disconnect the sensor wire connector.

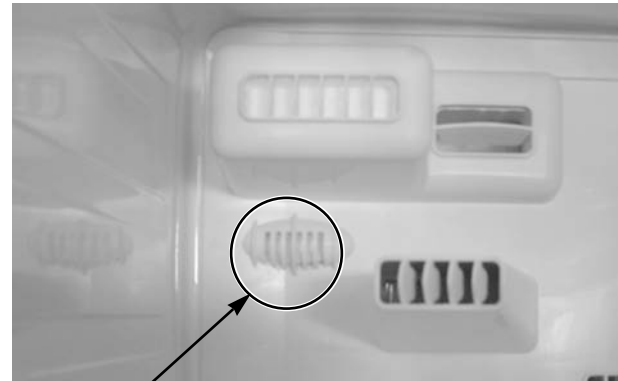
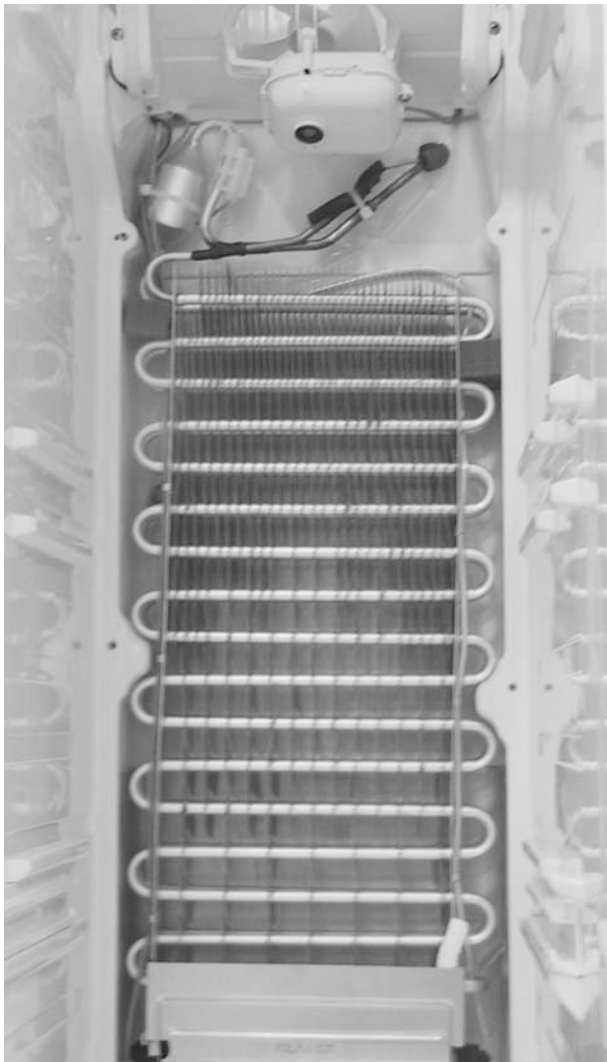


## Mechanical Disassembly

### Evaporator in Freezer

Evaporator is located in the bottom of freezer to produce cold air driven across the evaporator coils.

1. Take off the ductwork in Freezer.
2. Disconnect the wire connector (Heater, Bimetal, and Thermistor).
3. Desolder the inlet and outlet tubes.
4. Remove the evaporator.
5. Take the same steps to seal the system as mentioned earlier.



THERMISTOR

### Ice-Maker Thermistor

The Ice-Maker thermistor is located in its bottom. The temperature signal sends the micro-processor.



THERMISTOR

### Freezer Thermistor

The freezer thermistor is located at the top left of freezer vent. It sends temperature signals to the micro-processor.

## Mechanical Disassembly

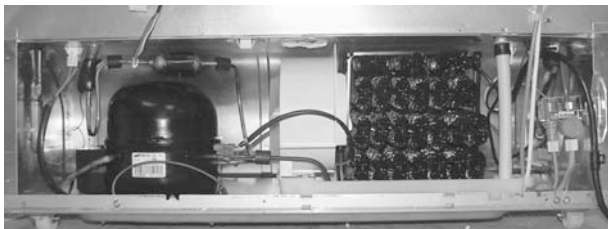
### 3-3) Machine Compartment Disassembly

#### Machine Compartment & Electric Box

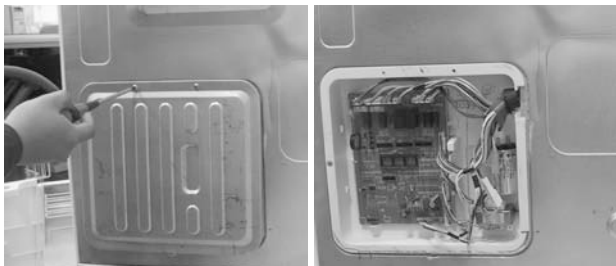
1. Disconnect the power cord of the refrigerator.
2. Remove the fixed screws (6) of compressor cover.



3. Slide up and take off the compressor cover to see the machine compartment.



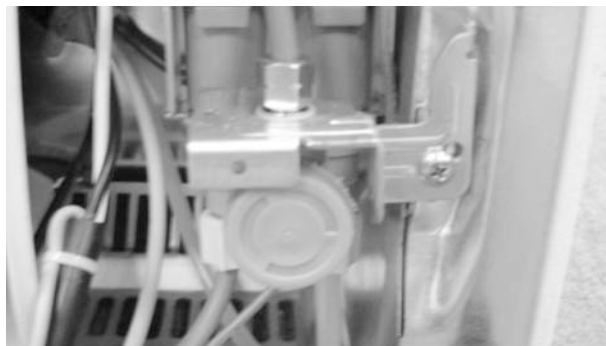
4. Remove screw (2) on the cover.



#### Water Solenoids

When the solenoids receive a signal from the micro-processor, they supply water to the water dispenser or the ice maker.

1. Remove bracket screw on cabinet.
2. Take the solenoids assembly out.
3. Disconnect water tubes.



#### Condenser Fan

The condenser Fan is located in the middle of machine compartment. It cools down the sub-condenser and the compressor.

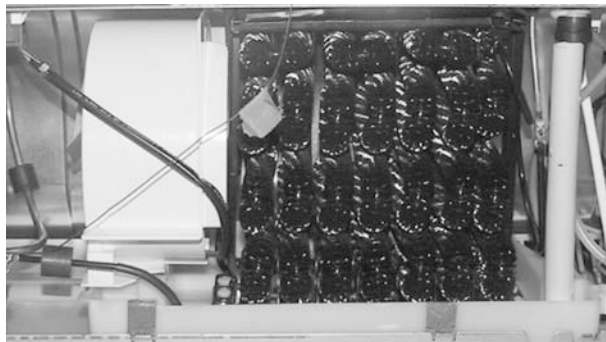
1. Lift up the rib under the support motor.
2. Pull the support motor.



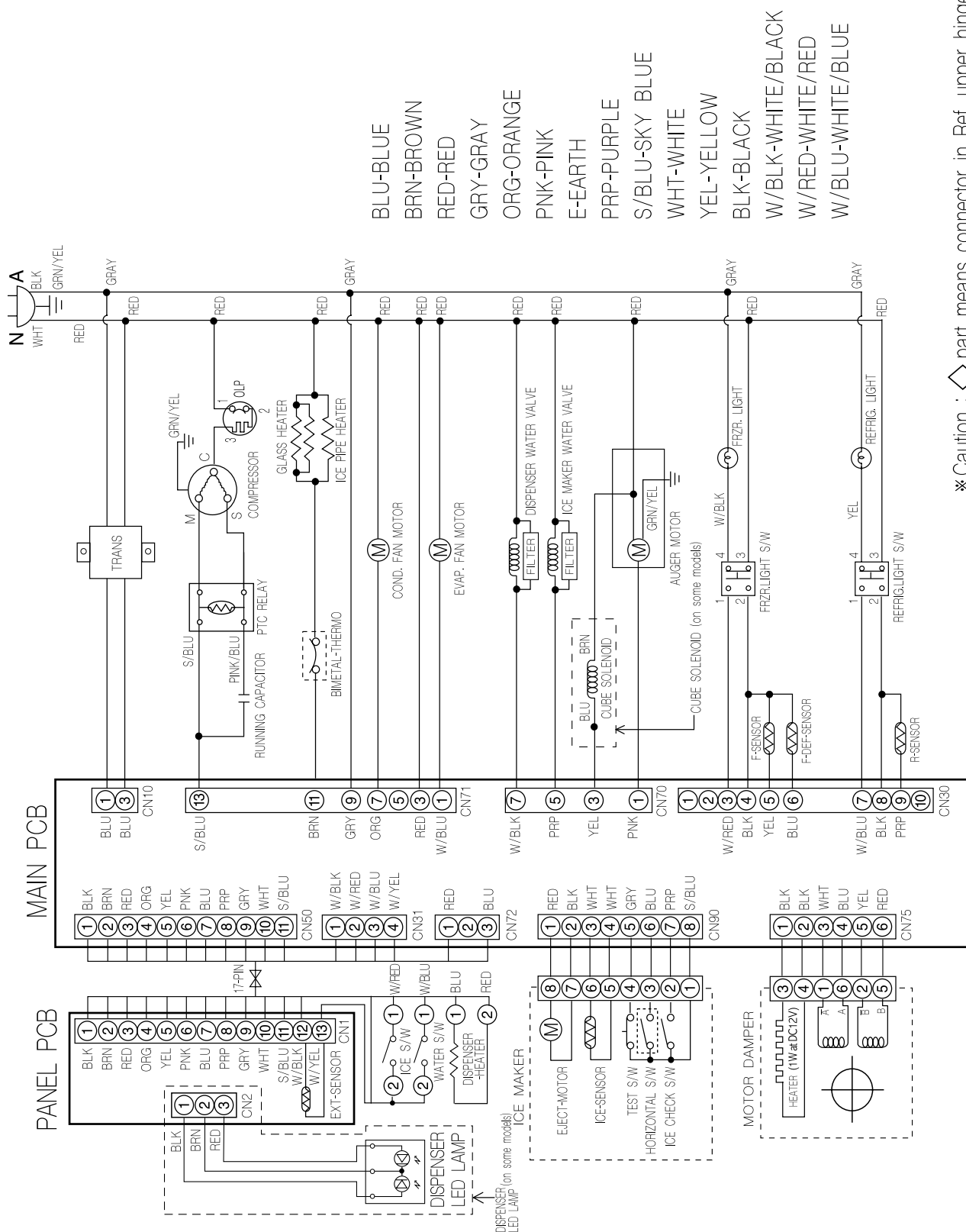
#### Condenser

The condenser is located in the machine compartment. The heat is extracted by condenser fan.

1. Desolder the compressor discharge & the condenser outlet.
2. Take out the condenser.



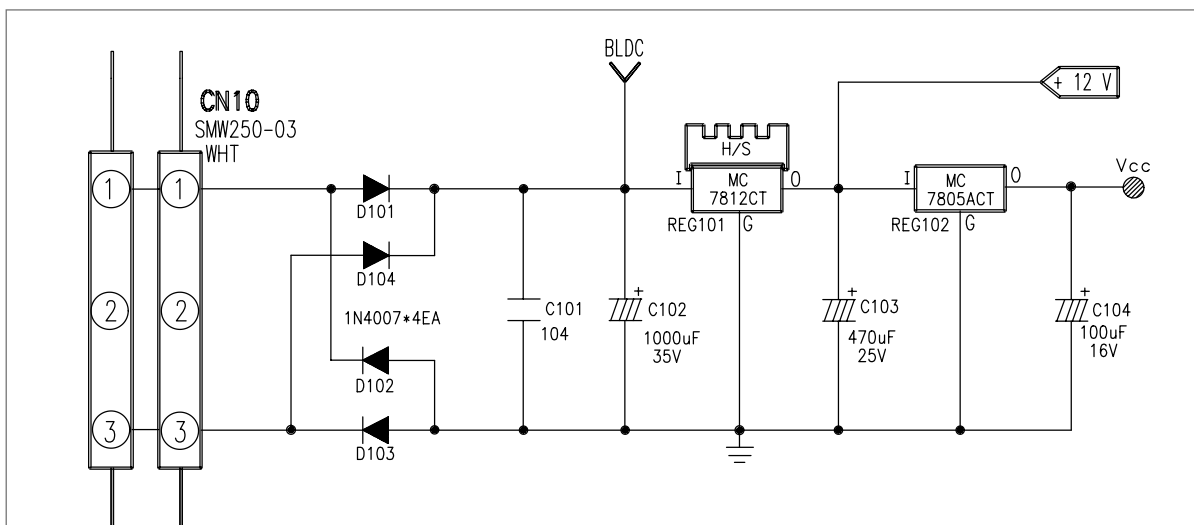
#### 4. CIRCUIT DIAGRAM



※Caution : ◇ part means connector in Ref. upper hinge.

## 5. OPERATION PRINCIPLES BY PARTS OF CIRCUIT

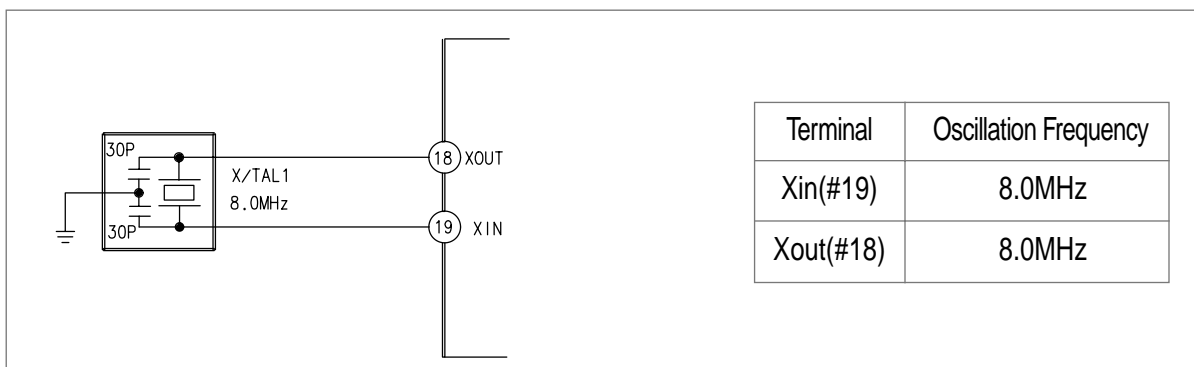
### 5-1) POWER



Terminal	Oscillation Frequency
● Vcc(DC 5V)	MICOM POWER AND SENSORS
<< BLDC	BLDC MOTOR POWER(NOT USE)
➤ +12V(DC 12V)	RELAY,PANEL POWER

- When turned on, rectified AC voltage which is stepped down on 2nd transformer flows between ① and ③ at about AC 15V, goes through the diode D101 and D104 is changed to DC, and provide constant 12V. It provides 5V to MICOM and other circuits via regulator REG102 (MC7805ACT), and make entire PCB operate.

### 5-2) OSCILLATION CIRCUIT

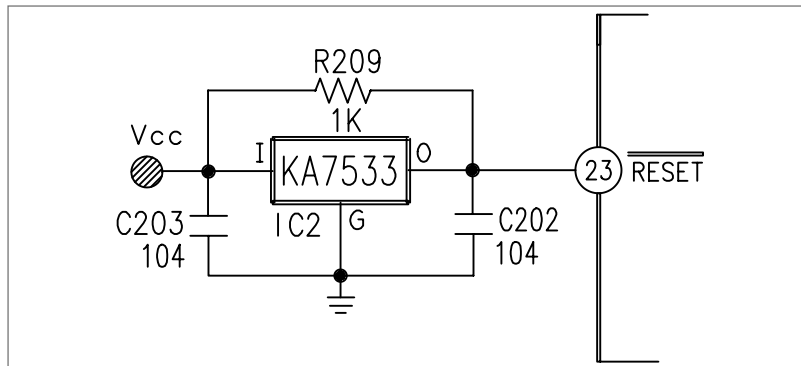


- It is an Oscillation Circuit for synchronism clock generation and time calculation on the information sending & receiving of the MICOM internal logic elements and when specifications for Resonator change, the timing system of MICOM changes resulting in errors. (Rated parts must be used)



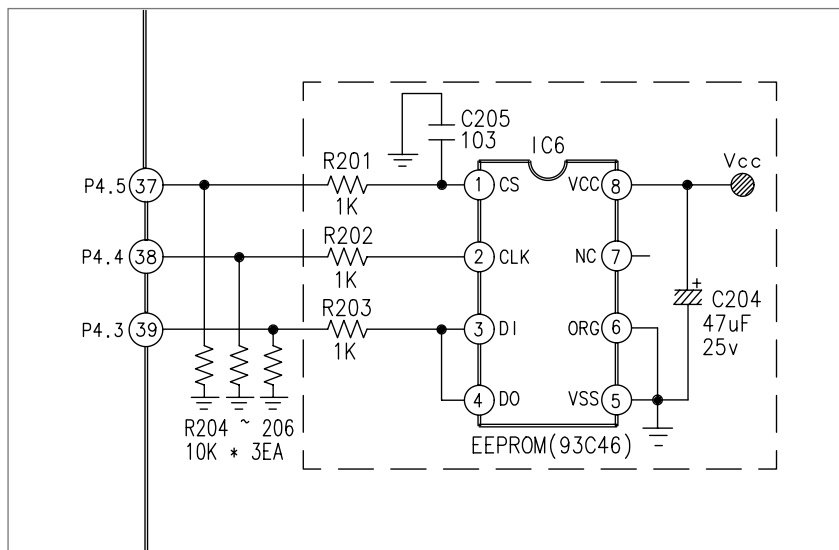
## OPERATION PRINCIPLES BY PARTS OF CIRCUIT

### 5-3) RESET CIRCUIT



- RESET Circuit allows the whole program to go back to the initial setting by initializing parts such as the RAM in MICOM with the power supply into MICOM or with an instant power failure. Upon the power supply, the reset terminal voltage becomes "LOW" for several tens of  $\mu s$  compared to  $V_{cc}$  voltage (DC 5V) at MICOM, and it maintains "HIGH" ( $V_{cc}$  Voltage) during normal operation. But, when  $V_{cc}$  drops down to 3.4~3.7V, the reset terminal voltage becomes "LOW".

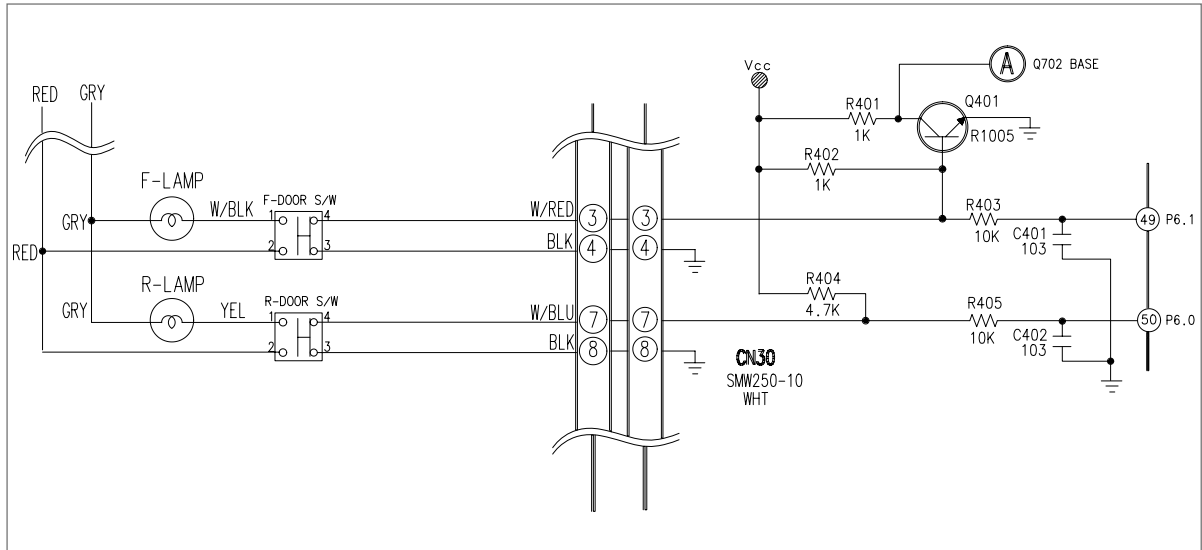
### 5-4) EEPROM DETECTION CIRCUIT



- A semiconductor memory EEPROM stores data remembering previous settings regardless of power-off, which are indispensable especially in power fluctuating areas. Also, EEPROM sets and uses other options in principle.

## OPERATION PRINCIPLES BY PARTS OF CIRCUIT

### 5-5) DOOR SWITCH DETECTON CIRCUIT

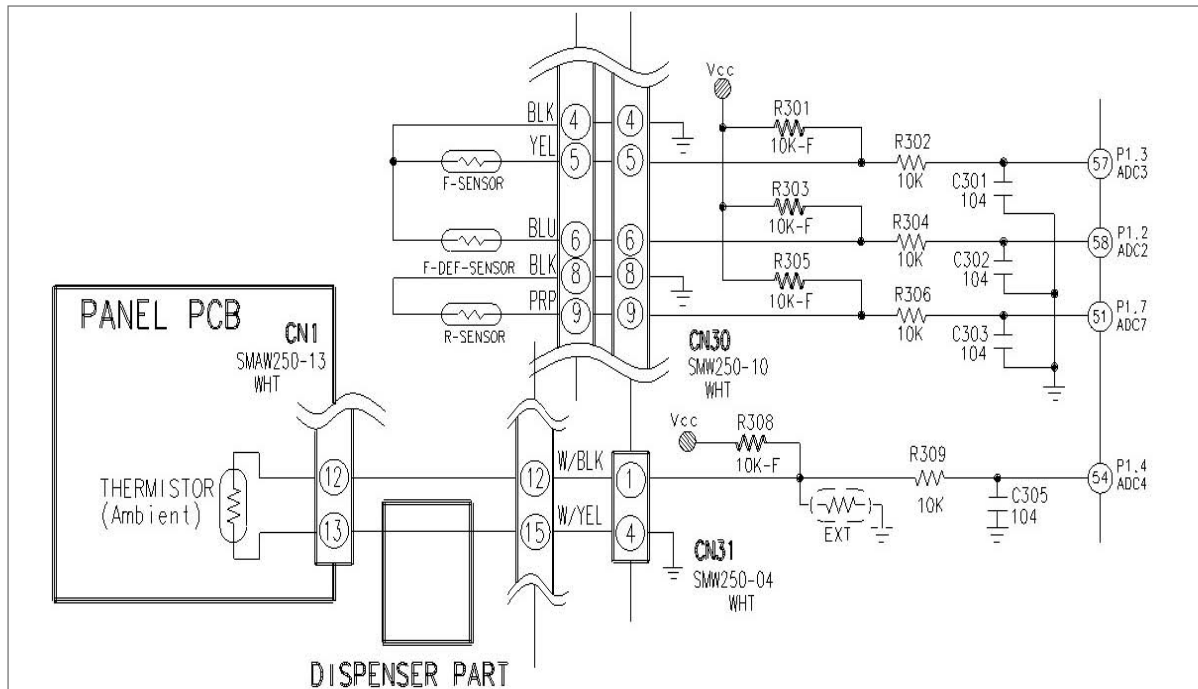


- 1) If R-Door is opened, the contact point of the door switch (4-3) becomes open, and the current of PCB line comes through R404 and R405 and provides 5 volt which is recognized as door is opened, and turn off the fan at different load. When the door is closed, the voltage goes out from R404 to Switch, the MICOM is applied with OV and the door is recognized as closed.
- 2) If F-Door is opened, the contact point of the door switch (4-3) becomes open, and the current of PCB line comes through R402 and R403 and provides 5 volt which is recognized as door is opened, and turn off the fan at different load. When the door is closed, the voltage goes out from R402 to Switch, the MICOM is applied with OV and the door is recognized as closed.
- 3) Q401 is the circuit to turn off the auger motor operation when the door is opened. If the door is closed, Vcc voltage of R402 works as ground via door switch, OV is applied to the base of Q401, and Q401 becomes operable, Vcc voltage on "A" part Q702 base works as emitter on Q401 collector and creates OV. (Check the operable condition for other parts at load terminals)
- 4) Condition for door open is the opposite of condition 3 above.

Category	Door	DOOR S/W Contact Point	MICOM PORT NO	MICOM INPUT
F	CLOSE	CLOSE	#50	"LOW"
	OPEN	OPEN		"HIGH"
R	CLOSE	CLOSE	#49	"LOW"
	OPEN	OPEN		"HIGH"

## OPERATION PRINCIPLES BY PARTS OF CIRCUIT

### 5-6) TEMP SENSING CIRCUIT



- 1) Sensor uses a thermistor which has a temp coefficient of negative resistance and controls resistance. When the heat goes up, the resistance gets down and vice versa. R302, 4, 6, 9 and C301~C303, C305 are parts for noise prevention but they are not related to temp sensing characteristics.
- 2) If  $V_f$  is the incoming voltage to MICOM in case of F-Sensor,  $V_f$  equals  $(R_{th} * V_{cc}) / (R_{301} + R_{th})$ . Where  $R_{th}$  is resistance of THERMISTOR corresponding to Temp. Please refer to the Appendix Temp-to-Sensor Resistance/Voltage conversion table(Temp-to-MICOM Terminal Voltage included) on A/S. (Next page)

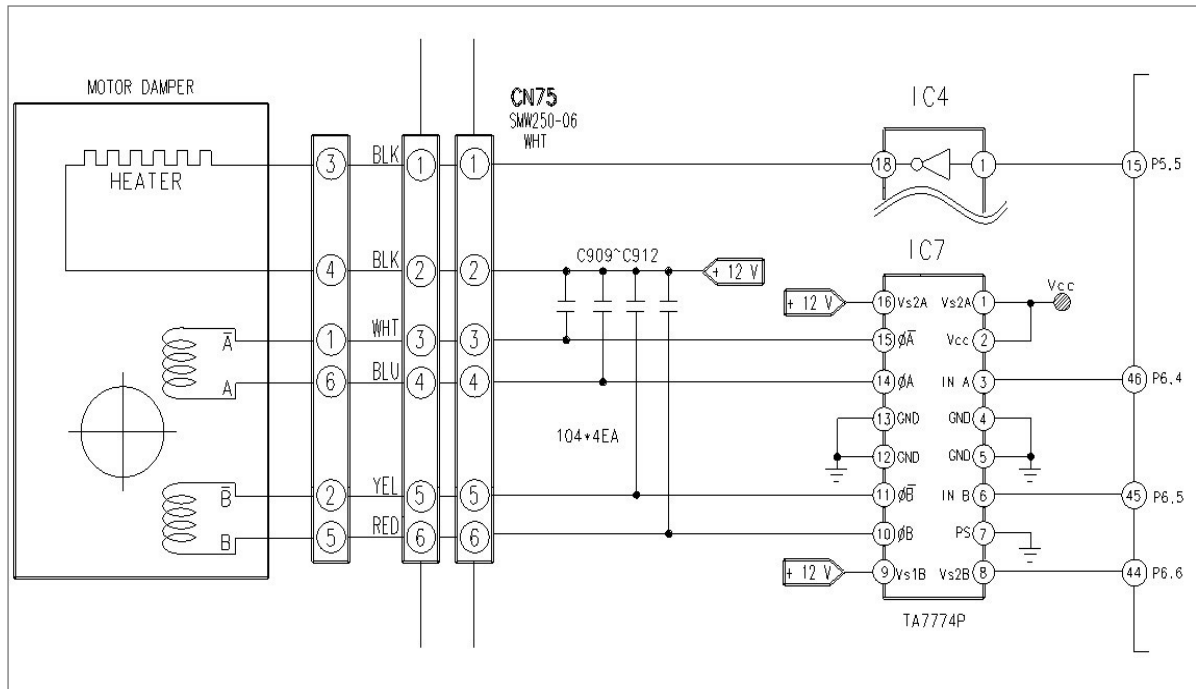
## OPERATION PRINCIPLES BY PARTS OF CIRCUIT

\* Temp to Resistance of Sensor & MICOM PORT Voltage  
Sensor CHIP : PX41C Standard

Temp.	Resistance(k $\Omega$ )	Voltage(V)	Temp.	Resistance(k $\Omega$ )	Voltage(V)	Temp.	Resistance(k $\Omega$ )	Voltage(V)	Temp.	Resistance(k $\Omega$ )	Voltage(V)
-50°F/-45.6°C	153319	4.694	-19°F/-28.3°C	30752	3.773	12°F/-11.1°C	8200	2.253	43°F/6.1°C	2714	1.068
-49°F/-45.0°C	144794	4.677	-18°F/-27.8°C	29350	3.729	13°F/-10.6°C	7888	2.205	44°F/6.7°C	2627	1.04
-48°F/-44.4°C	136798	4.659	-17°F/-27.2°C	28021	3.685	14°F/-10.0°C	7590	2.158	45°F/7.2°C	2543	1.014
-47°F/-43.9°C	129294	4.641	-16°F/-26.7°C	26760	3.64	15°F/-9.4°C	7305	2.111	46°F/7.8°C	2462	0.988
-46°F/-43.3°C	122248	4.622	-15°F/-26.1°C	25562	3.594	16°F/-8.9°C	7032	2.064	47°F/8.3°C	2384	0.963
-45°F/-42.8°C	115631	4.602	-14°F/-25.6°C	24425	3.548	17°F/-8.3°C	6771	2.019	48°F/8.9°C	2309	0.938
-44°F/-42.2°C	109413	4.581	-13°F/-25.0°C	23345	3.501	18°F/-7.8°C	6521	1.974	49°F/9.4°C	2237	0.914
-43°F/-41.7°C	103569	4.56	-12°F/-24.4°C	22320	3.453	19°F/-7.2°C	6281	1.929	50°F/10.0°C	2167	0.891
-42°F/-41.1°C	98073	4.537	-11°F/-23.9°C	21345	3.405	20°F/-6.7°C	6052	1.885	51°F/10.6°C	2100	0.868
-41°F/-40.6°C	92903	4.514	-10°F/-23.3°C	20418	3.356	21°F/-6.1°C	5832	1.842	52°F/11.1°C	2036	0.846
-40°F/-40.0°C	88037	4.49	-9°F/-22.8°C	19537	3.307	22°F/-5.6°C	5621	1.799	53°F/11.7°C	1973	0.824
-39°F/-39.4°C	83456	4.465	-8°F/-22.2°C	18698	3.258	23°F/-5.0°C	5419	1.757	54°F/12.2°C	1913	0.803
-38°F/-38.9°C	79142	4.439	-7°F/-21.7°C	17901	3.208	24°F/-4.4°C	5225	1.716	55°F/12.8°C	1855	0.783
-37°F/-38.3°C	75077	4.412	-6°F/-20.6°C	17142	3.158	25°F/-3.9°C	5000	1.675	56°F/13.3°C	1799	0.762
-36°F/-37.8°C	71246	4.385	-5°F/-20.0°C	16419	3.107	26°F/-3.3°C	4861	1.636	57°F/13.9°C	1745	0.743
-35°F/-37.2°C	67634	4.356	-4°F/-19.4°C	15731	3.057	27°F/-2.8°C	4690	1.596	58°F/14.4°C	1693	0.724
-34°F/-36.7°C	64227	4.326	-3°F/-19.4°C	15076	3.006	28°F/-2.2°C	4526	1.558	59°F/15.0°C	1642	0.706
-33°F/-36.1°C	61012	4.296	-2°F/-18.9°C	14452	2.955	29°F/-1.7°C	4369	1.52	60°F/15.6°C	1594	0.688
-32°F/-35.6°C	57977	4.264	-1°F/-18.3°C	13857	2.904	30°F/-1.1°C	4218	1.483	61°F/16.1°C	1547	0.67
-31°F/-35.0°C	55112	4.232	0°F/-17.8°C	13290	2.853	31°F/-0.6°C	4072	1.447	62°F/16.7°C	1502	0.653
-30°F/-34.4°C	52406	4.199	1°F/-17.2°C	12749	2.802	32°F/0.0°C	3933	1.412	63°F/17.2°C	1458	0.636
-29°F/-33.9°C	49848	4.165	2°F/-16.7°C	12233	2.751	33°F/0.6°C	3799	1.377	64°F/17.8°C	1416	0.62
-28°F/-33.3°C	47431	4.129	3°F/-16.1°C	11741	2.7	34°F/1.1°C	3670	1.343	65°F/18.3°C	1375	0.604
-27°F/-32.8°C	45146	4.093	4°F/-15.6°C	11271	2.649	35°F/1.7°C	3547	1.309	66°F/18.9°C	1335	0.589
-26°F/-32.2°C	42984	4.056	5°F/-15.0°C	10823	2.599	36°F/2.2°C	3428	1.277	67°F/19.4°C	1297	0.574
-25°F/-31.7°C	40938	4.018	6°F/-14.4°C	10395	2.548	37°F/2.8°C	3344	1.253	68°F/20.0°C	1260	0.56
-24°F/-31.1°C	39002	3.98	7°F/-13.9°C	9986	2.498	38°F/3.3°C	3204	1.213	69°F/20.6°C	1225	0.546
-23°F/-30.6°C	37169	3.94	8°F/-13.3°C	9596	2.449	39°F/3.9°C	3098	1.183	70°F/21.1°C	1190	0.532
-22°F/-30.0°C	35433	3.899	9°F/-12.8°C	9223	2.399	40°F/4.4°C	2997	1.153	71°F/21.7°C	1157	0.519
-21°F/-29.4°C	33788	3.858	10°F/-12.2°C	8867	2.35	41°F/5.0°C	2899	1.124	72°F/22.2°C	1125	0.506
-20°F/-28.9°C	32230	3.816	11°F/-11.7°C	8526	2.301	42°F/5.6°C	2805	1.095	73°F/22.8°C	1093	0.493

## OPERATION PRINCIPLES BY PARTS OF CIRCUIT

### 5-7) DAMPER CIRCUIT



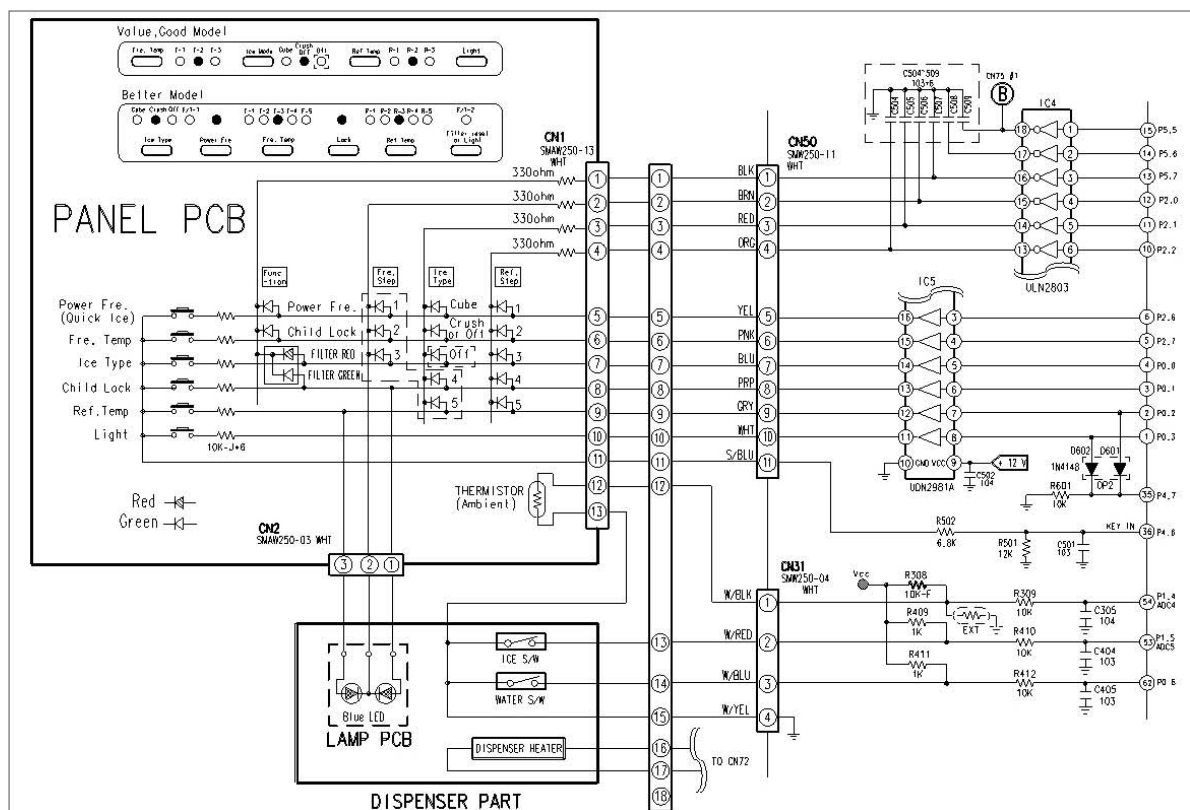
- 1) The temperature of R-room is controlled by opening and closing of damper with stepping motor, supplying & blocking cold air.
- 2) TA7774P (IC07) operates the damper. TA7774P is the driver IC only for step motor. If the regular signal is provided to TA7774P from Micom, send combined signal to Quad-Polar step motor to rotate on certain direction. This makes clockwise or counter clockwise rotation to make the damper open or close.
- 3) Since the damper always touches the cold air, DC 12V/1W heater is installed, always on to prevent the malfunction from moisture and is controlled on conditions. (Operation conditions can be changed). Micom #15 pin connected to IC4 controls the damper heater like category 3.

### 5-8) DISPLAY Circuit

#### 1) KEY SCAN

When Grid #6 is output, this signal goes through PCB resistance  $10\text{ k}\Omega$  and provided to power frequency. When the switch is pressed, R502( $6.8\text{ k}\Omega$ ) and R501 ( $12\text{ k}\Omega$ ) decrease the signal and less than 5.1V peak to peak signal is provided to MICOM, the MICOM recognizes the grid #6 is provided, and change the function corresponding to switch key. [Refer the circuit diagram below]

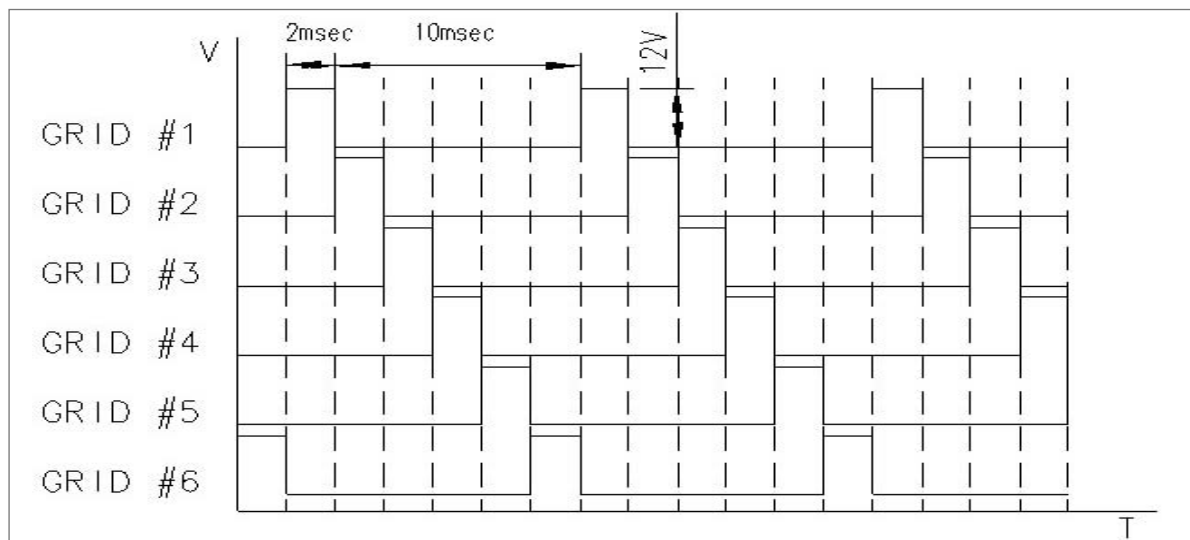
## OPERATION PRINCIPLES BY PARTS OF CIRCUIT



## 2) DISPLAY OPERATION

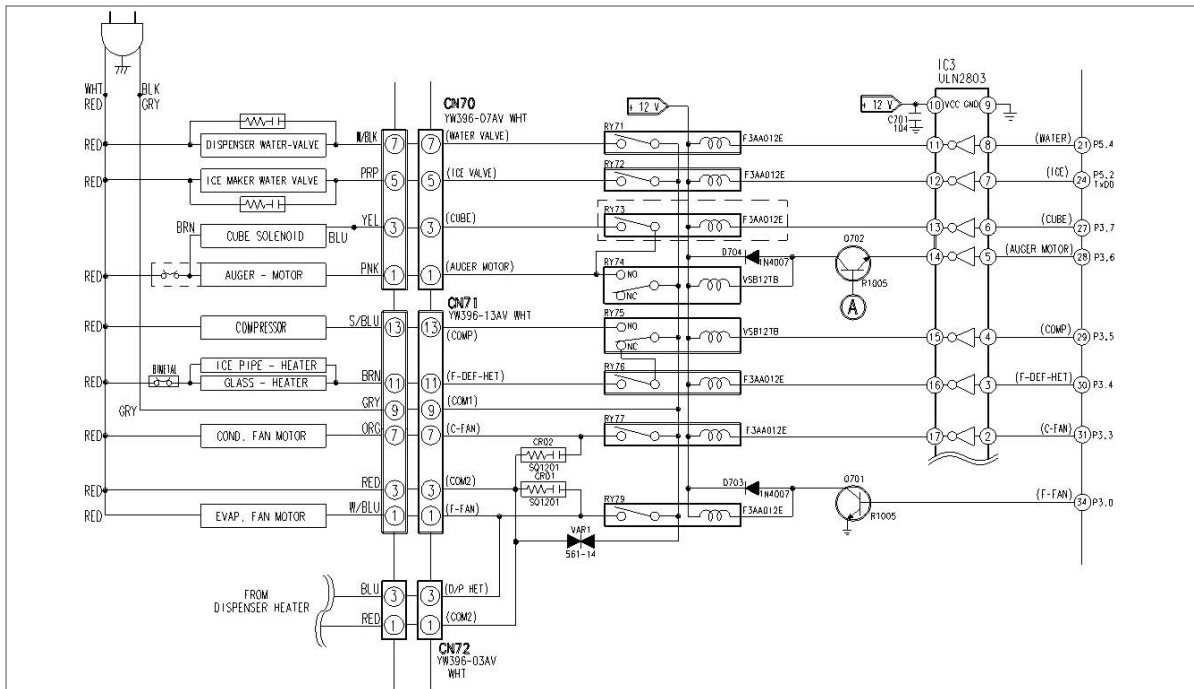
Like the signal diagram below, Micom sends " high " signal through MICOM 6 terminals of NO #1→ 2 → 3 → 4 → 5 → 6 for 2ms every 12ms. This signal goes to output terminal via input terminal of IC5 (KID65783AP or TD62783AP). Output wave always goes through LED input terminal with DC11~12V on every period. At this time, if SINK signal comes out at IC4, DC11~ 12V is applied to LED input terminal and output terminal sinks to OV which turn on LED for 2ms For example, to turn on "Power Fre." LED, IC4 #16 pin sinks to 0V when IC5 #16 becomes DC 11~12V making "Power Fre" LED turn on.

\* GRID WAVE PATTERN

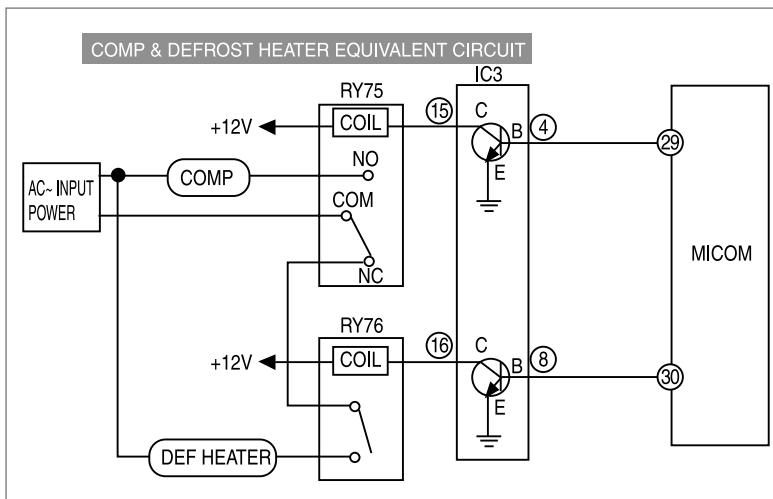


# OPERATION PRINCIPLES BY PARTS OF CIRCUIT

## 5-9) Load Control Circuit



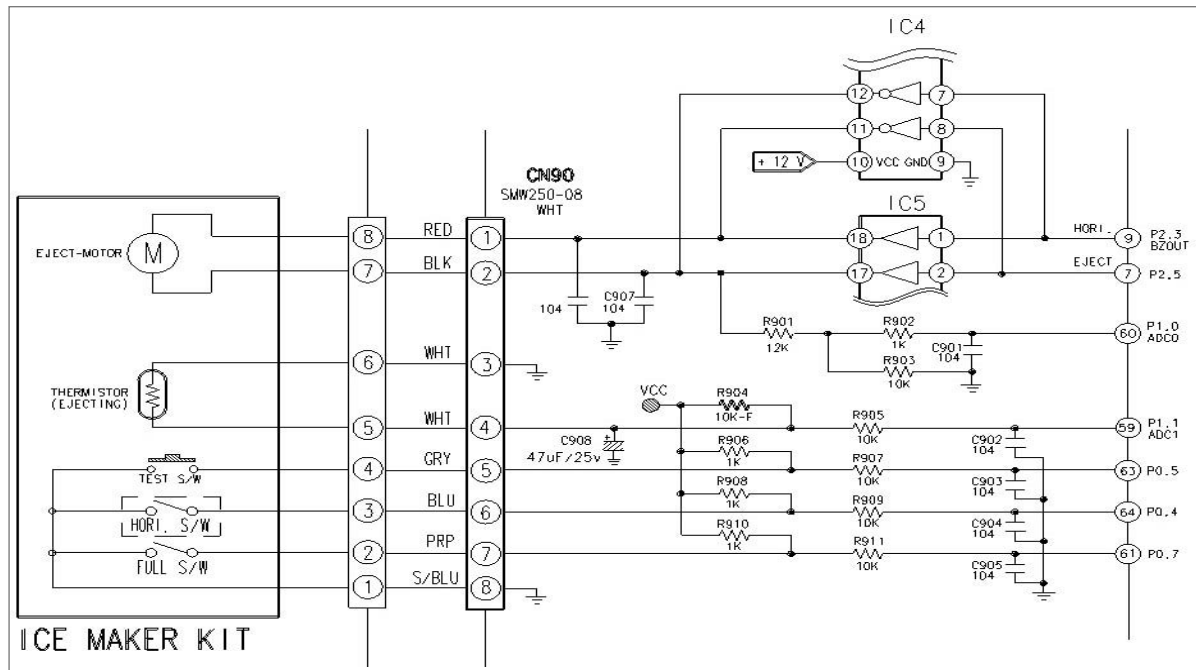
- 1) Main PCB processes most of the load control for electronic refrigerators.
- 2) Compressor, F-Room, defrost heater, and other functions are controlled with relay.
- 3) For example, to operate compressor, MICOM 29 pin outputs high (5V) signal which goes into IC3 Pin #4. The IC3 pin NO 4 plays the same role as the base of NPN TR. The pin #14 works as collector of TR. So, if 5V is supplied to pin #4 of IC3, the pin #15 turned on and connected to the ground. Then, the relay RY75 and coil connected to the pin #15 of IC3 becomes low (0V) and +12V (opposite side of coil) flows to the pin #15 of IC3 via coil and goes into the ground. While current flows to the coil, the magnetic power arise, it turns on the secondary contact point inside of RY75, and operates when the AC power is supplied to the both side of comp. When MICOM #29 Pin becomes Low(0V), IC3 #4 Pin becomes Low which makes Power cut and current of RY75 RELAY cut. So, secondary contact becomes off due to magnetic field cut, which makes Comp off.
- 4) All other loads work basically on same principle, defrost heater operates only on the condition that the compressor is turned off like the circuit above, and connected like the equivalent circuit below.



\* Q710 is connected to the F door switch to prevent PL accident due to continuous operation of motor when the auger motor control circuit is not working properly. It must be turned off when the door is opened.

## OPERATION PRINCIPLES BY PARTS OF CIRCUIT

### 5-10) ICE MAKER OPERATION CIRCUIT

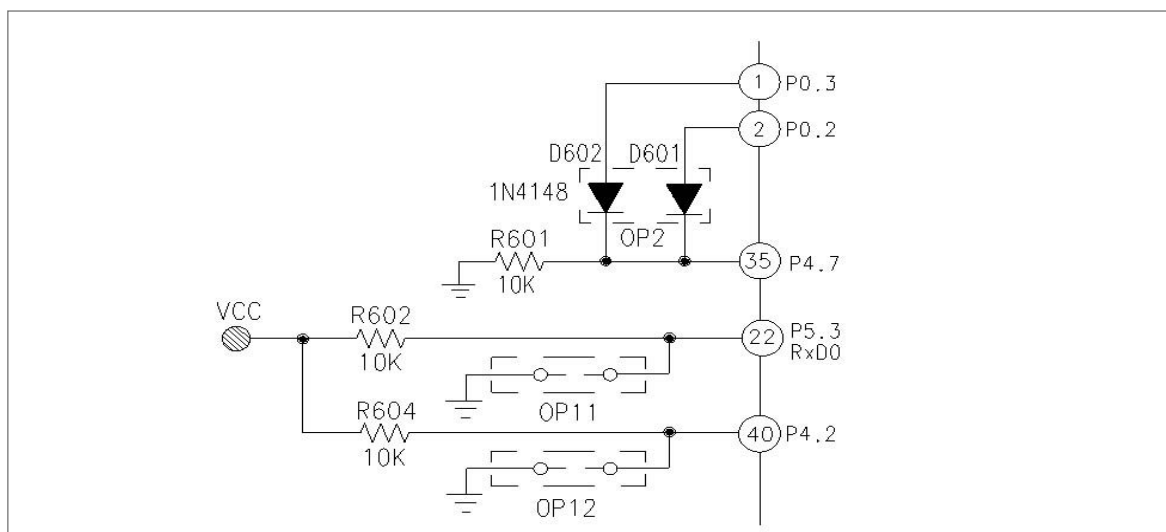


- 1) The ice maker circuit above is to control the ice maker kit installed on the F room.
- 2) This circuit is the hardware to control ejection and horizontal positioning, ice making temperature detection and full icing detection. Temperature detection circuit is the same as temperature detection circuit on 4-6 and the explanation will be skipped and only the ejection circuit will be explained. If MICOM PORT #7 is outputted with High to rotate motor in ejection direction and the pin #2 of IC5 is inputted, 12V is outputted on pin #17 of IC5, goes to motor and supplied to pin #11 of IC4. As pin #8 of IC4 and eject MICOM port #7 are connected in common, 11 output port of IC4 gets on and the current flows into Ground making motor rotates. This motor rotates the gear and rotates the ejection tray. The tray twists to separate the ice from the tray and return to the horizontal state.
- 3) For restoration, motor stops for 2 seconds when the ejection is completed and to rotate in opposite direction, output horizontal MICOM port with high and perform horizontal positioning.
- 4) The test S/W is off in normal cases and MICOM PORT 63 stays high. When necessary, press the switch for more than 1.5 seconds making forced ejection executed. Full S/W has a lever that detects the amount of ice on ice-maker kit and based on the status of MICRO S/W connected to the lever, if the ice is full on the container, ejection is not executed, and only if it is off (MICRO PORT 61 is high), the ejection is executed.



# OPERATION PRINCIPLES BY PARTS OF CIRCUIT

## 5-11) OPTION Circuit

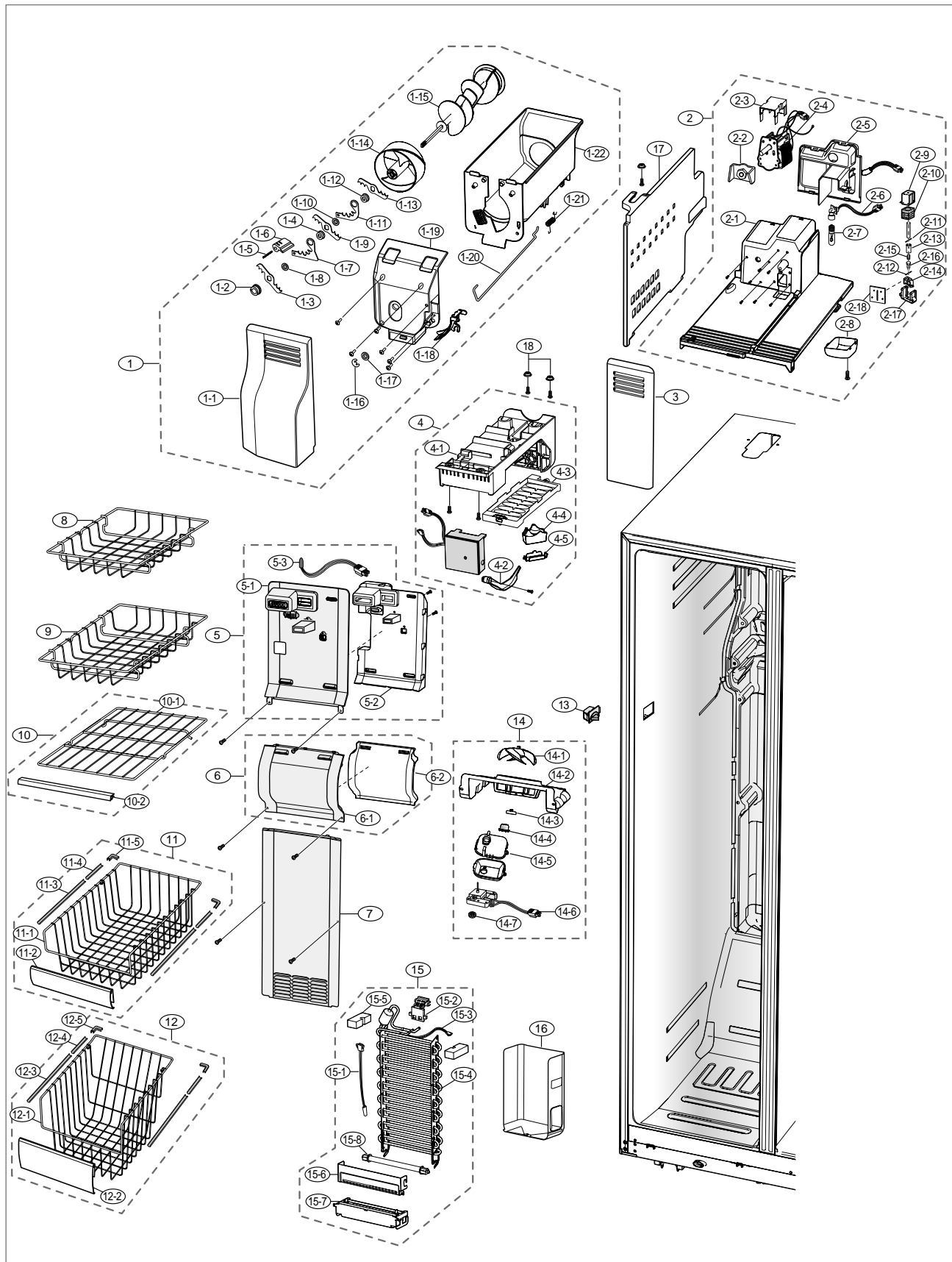


- This circuit operates with the initial power on, uses DIODE (1N4148) or JUMPER WIRE.  
To modify option circuit, Power must be turned off before modification and turned on after the modification.  
Refer to the table below, the default factory values are highly recommended unless exceptional cases.

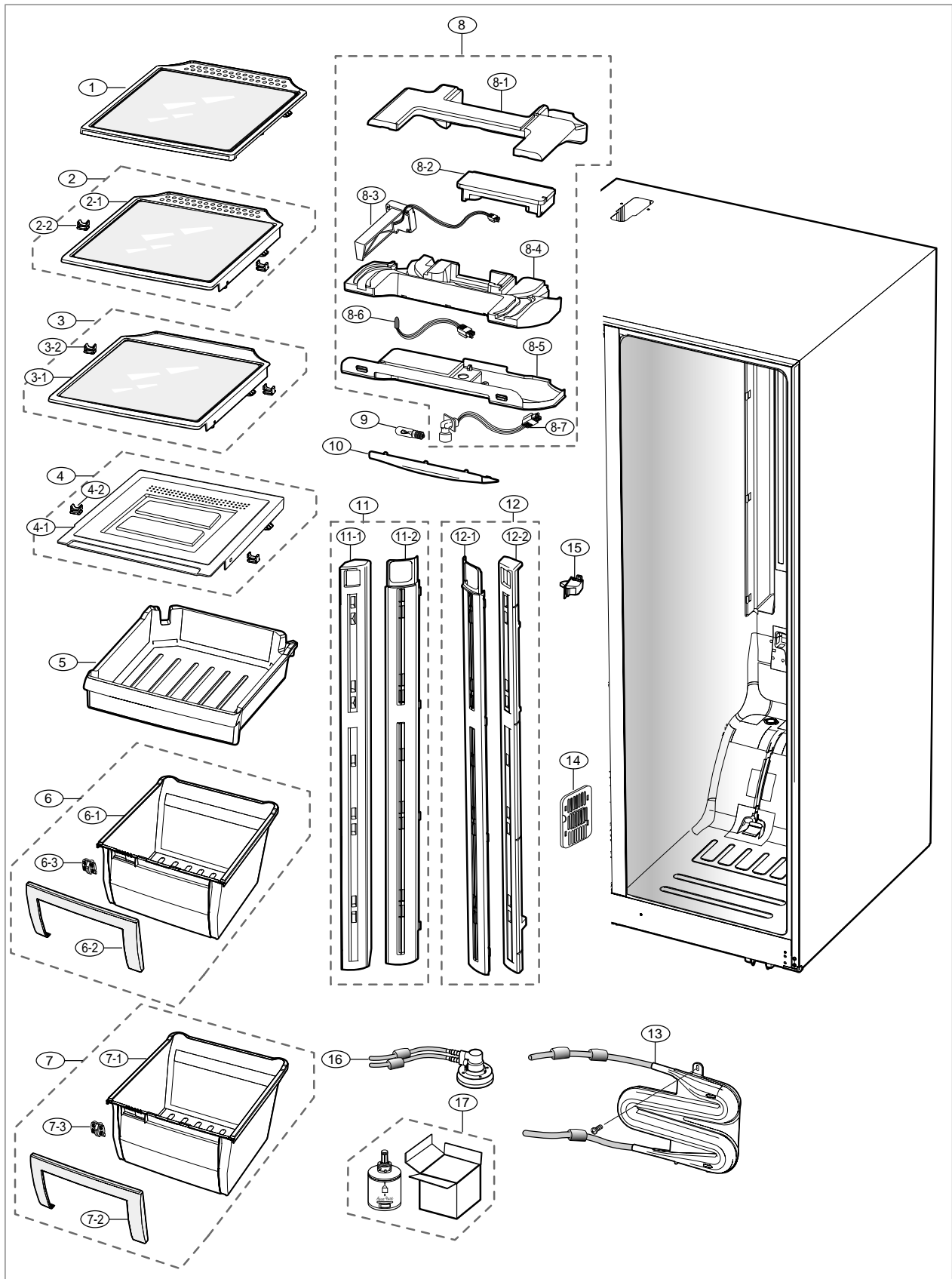
OP11, OP12			
OP11	OP12	MODEL	FUNTION
<input type="radio"/>	<input type="radio"/>	RS2*11	No Cruch, 3 Step, Light
<input type="radio"/>	<input checked="" type="radio"/>	RS2*21	Cruch, 3 Step, Light
<input checked="" type="radio"/>	<input type="radio"/>	RS2*31	Cruch, 5 Step, P/F, L/T Lock, Filter, Indicator
* <input checked="" type="radio"/> Jumper USE OP2 < Water Fill Time Control Option >			
D601	D602	Fill Time	Remark
<input checked="" type="radio"/>	<input checked="" type="radio"/>	5 Sec	Flow Sensor Not USE
<input checked="" type="radio"/>	<input type="radio"/>	6 Sec	
<input type="radio"/>	<input checked="" type="radio"/>	7 Sec	
<input type="radio"/>	<input type="radio"/>	10 Sec	
* <input checked="" type="radio"/> Diode(1N4148) USE			

## 6. Illustrated Parts Catalog.

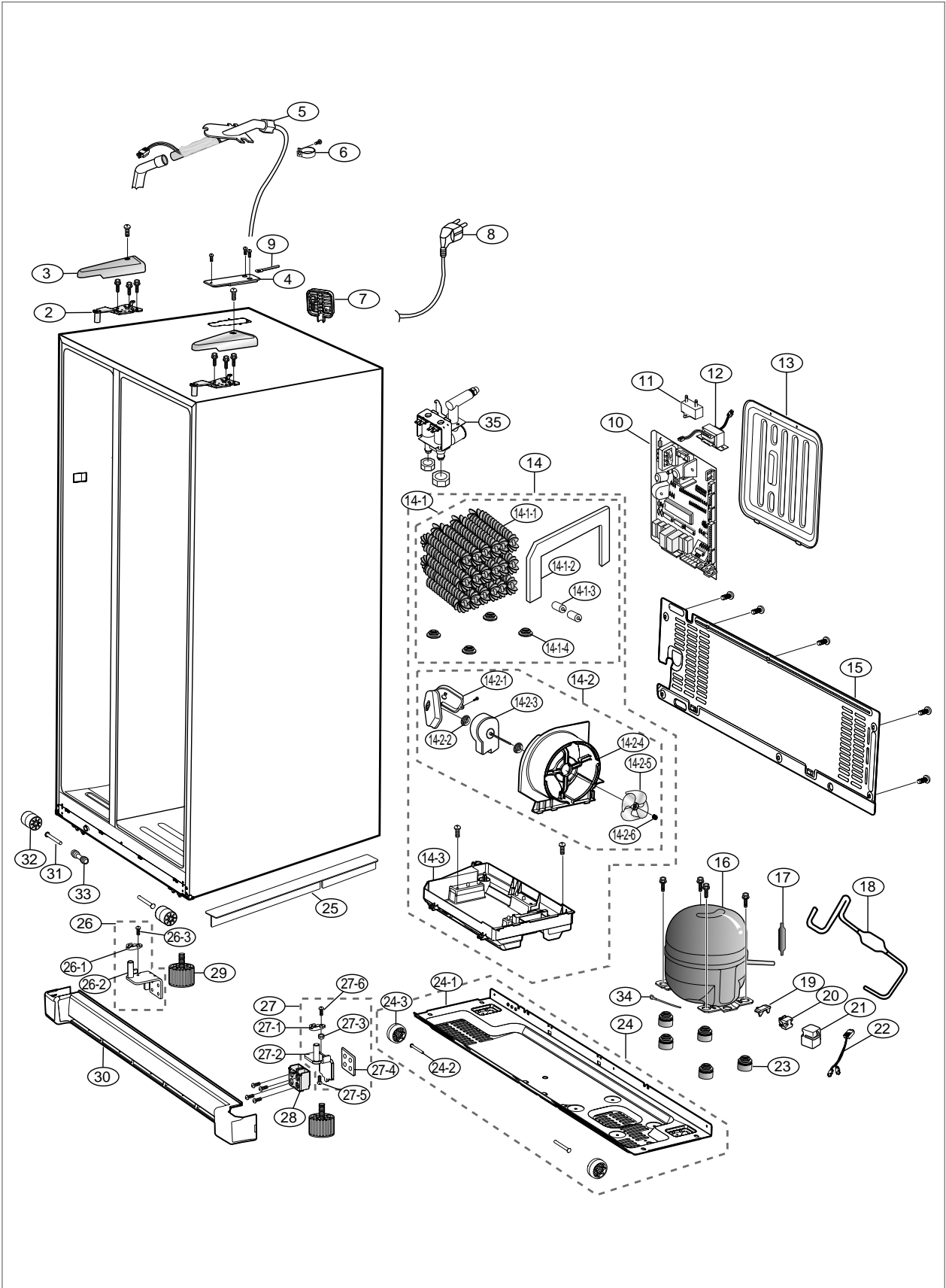
### 6-1) Freezer



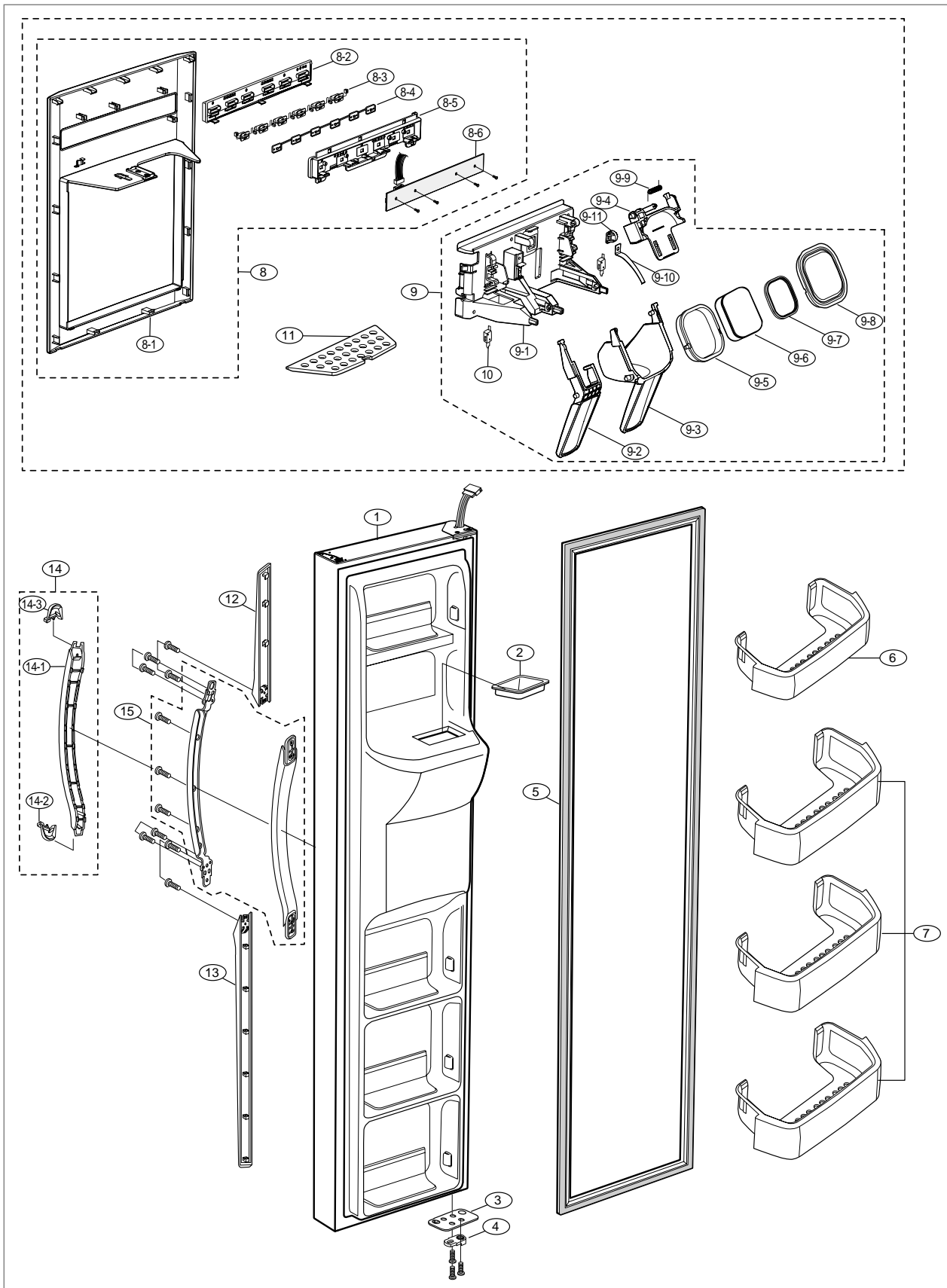
6-2) Refrigerator



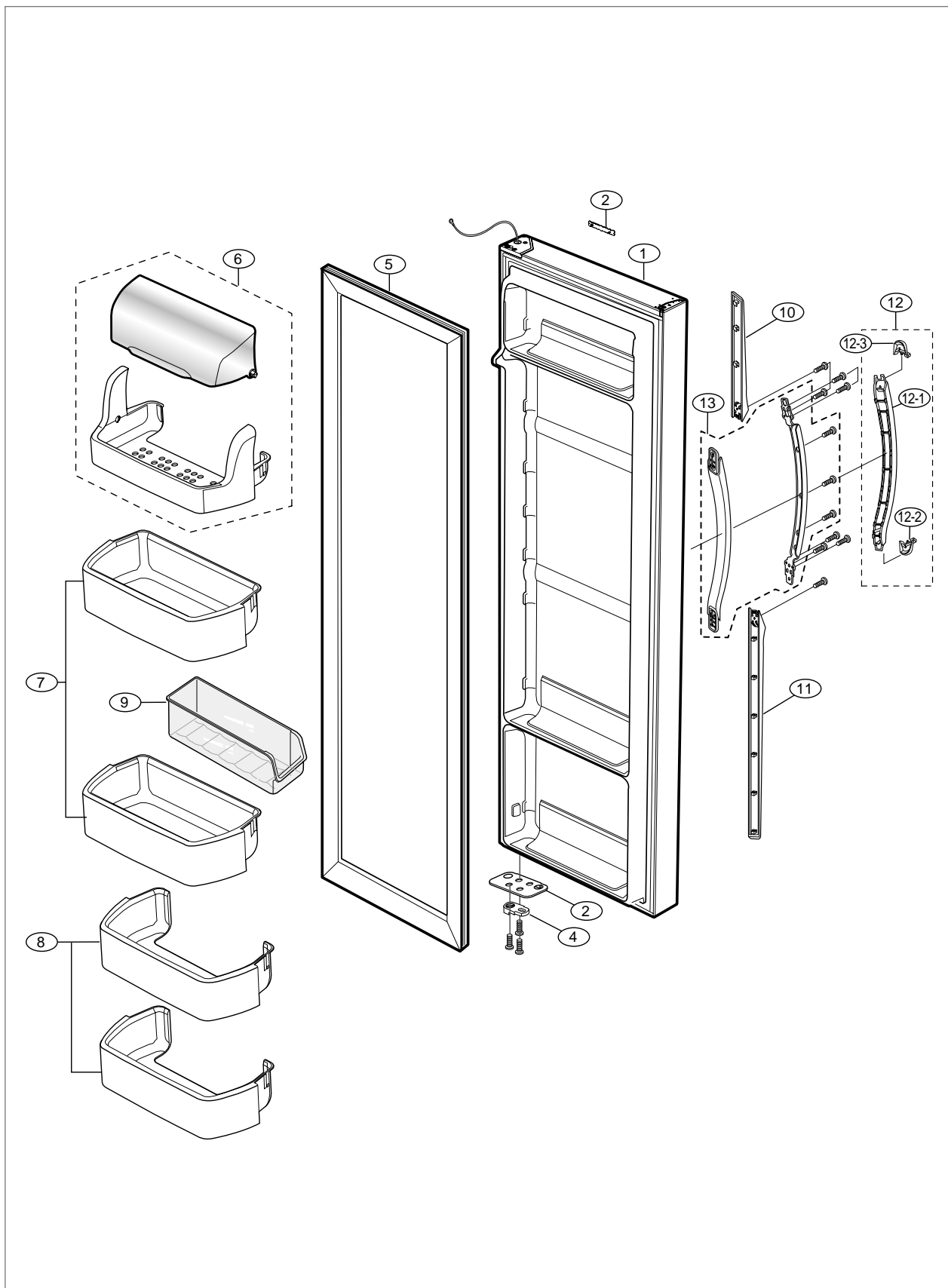
## 6-3) Cabinet



## 6-4) Disassembly of Freeze Door

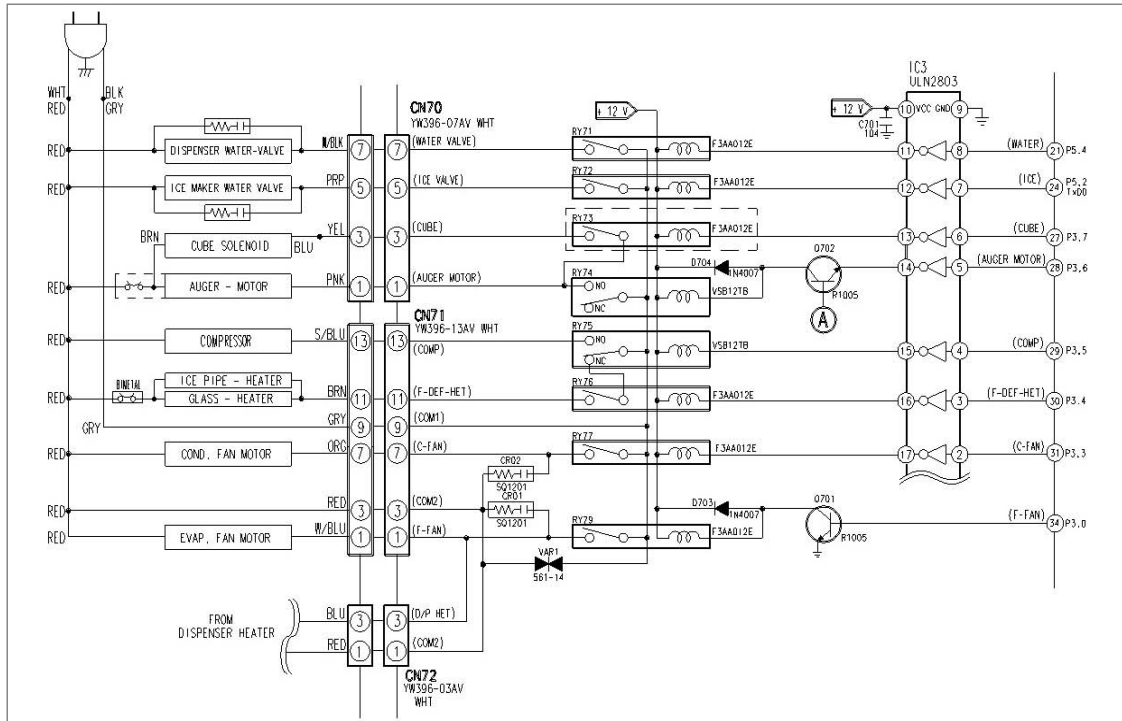


6-5) Disassembly of Refrigerator Door



## Appendix I (Reference for circuit diagnostics)

### Ref.1) Measure Load Terminals



\* Turn off Power, disassemble Housing connected to MAIN PCB CN70,71,72 and measure followings

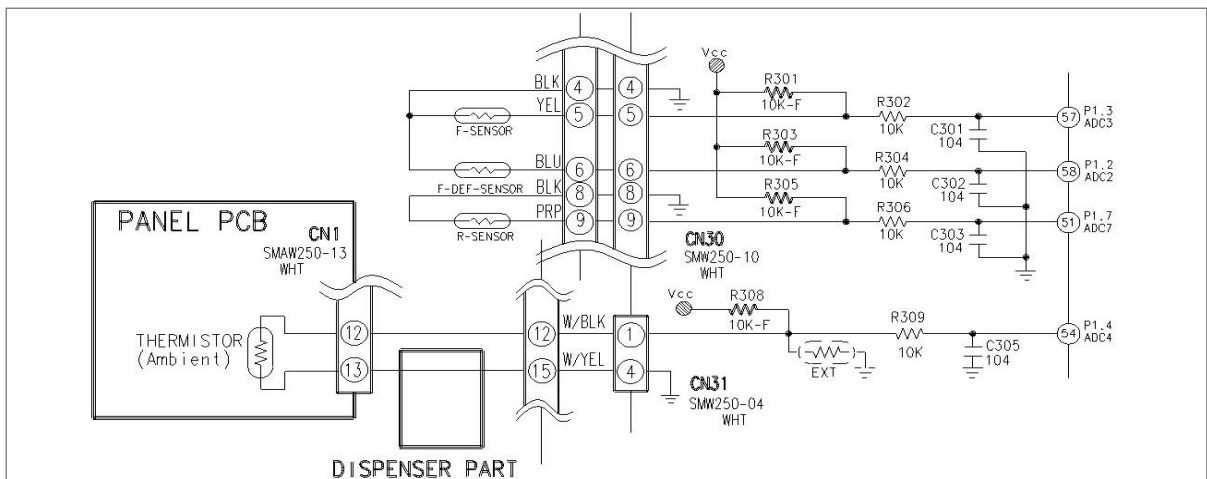
LOAD	TERMINALS PCB CASE	VALUE	DEFECTS	OTHERS
1) DEFROST HEATER 2) ICE PIPE HEATER	CN71 ⑪ & ③	0Ω	THERMAL FUSE, HEATER, WIRE SHORT THERMAL	
		∞Ω	BIMETAL, HEATER, WIRE CUT	
DISPENSER HEATER	CN72 ① & ③	0Ω	HEATER, WIRE SHORT	
		∞Ω	HEATER, WIRE CUT OR HOUSING SLIPPED AWAY	
WATER VALVE ICE MAKER	CN70 ⑤ & CN71 ③	0Ω	COIL, WIRE SHORT	
		∞Ω	COIL, WIRE CUT	
WATER VALVE DISPENSER	CN70 ⑦ & CN71 ③	0Ω	COIL, WIRE SHORT	
		∞Ω	COIL, WIRE CUT	
AUGER MOTOR	CN70 ① & CN71 ③	0Ω	COIL, WIRE SHORT	
		∞Ω	COIL, WIRE CUT	
CUBE SOLENOID	CN70 ③ & CN71 ③	0Ω	COIL, WIRE SHORT	
		∞Ω	COIL, WIRE CUT	
COMP. FAN MOTOR	CN71 ⑦ & ③	0Ω	MOTOR, WIRE SHORT MOTOR, WIRE CUT OR	
		∞Ω	HOUSING SLIPPED AWAY	
F FANMOTOR	CN71 ① & ③	0Ω	MOTOR, WIRE SHORT	
		∞Ω	MOTOR, WIRE CUT OR HOUSING SLIPPED AWAY	

## Appendix I (Reference for circuit diagnostics)

\* Turn on Power and check status of Relay & Driving Circuit by checking followings according to load operation.

LOAD	RELAY	TERMINALS	VALUE	WHEN IT IS DIFFERENT FROM MEASURED VALUE
DEFROST / COMP OFF	RY76 /RY75	CN71⑪~⑨	SUPPLY VOLTAGE(SV)	RY76 CONTACT SHORT, FAULTY DRIVING CIRCUIT
	RY75	CN71⑬~⑨	SV	RY75 NO CONTACT SHORT, FAULTY DRIVING CIRCUIT
COMP ON	RY76 /RY75	CN71⑪~⑨	SV	FAULTY RY75 / RY76 NO CONTACT SHORT, FAULTY DRIVING CIRCUIT
	RY75	CN71⑬~⑨	0V	RY75 NO CONTACT OPEN, FAULTY DRIVING CIRCUIT
DEFROST	RY76 /RY75	CN71⑪~⑨	0V	FAULTY RY76 / RY75 NC CONTACT OPEN, FAULTY DRIVING CIRCUIT
	RY75	CN71⑬~⑨	SV	RY75 NO CONTACT SHORT, FAULTY DRIVING CIRCUIT
CUBE & AUGER MOTOR OFF	RY73 /RY74	CN71⑨~CN70③	SV	RY73 &RY74 NO CONTACT SHORT, FAULTY DRIVING CIRCUIT
	RY74	CN71⑨~CN70①	SV	RY74 NO CONTACT SHORT, FAULTY DRIVING CIRCUIT
CUBE & AUGER MOTOR OPERATING	RY73 /RY74	CN71⑨~CN70③	0V	RY73 OR RY74 NO CONTACT OPEN, FAULTY DRIVING CIRCUIT
	RY74	CN71⑨~CN70①	0V	RY74 NO CONTACT OPEN, FAULTY DRIVING CIRCUIT
F FAN ON	RY79	CN71①~⑨	0V	RY79 NO CONTACT OPEN, FAULTY DRIVING CIRCUIT
C FAN ON	RY77	CN71⑦~⑨	0V	RY77 NO CONTACT OPEN, FAULTY DRIVING CIRCUIT
WATER VALVE DISPENSER OPERATING	RY71	CN71⑨~CN70⑦	0V	RY71 NO CONTACT OPEN, FAULTY DRIVING CIRCUIT
WATER VALVE ICE MAKER OPERATING	RY72	CN71⑨~CN70⑤	0V	RY72 NO CONTACT OPEN, FAULTY DRIVING CIRCUIT

### Ref.2) Check SENSOR



\* Check after disassembling connected to MAIN PCB CN30 & CN32

\* Because it is NTC TYPE Sensor, resistance decreases as temp increases

1. Measure resistance between CN30 ⑧ and ⑨ for R-Sensor.
2. Measure resistance between CN30 ⑤ and ④ for F-Sensor.
3. Measure resistance between CN30 ⑥ and ④ for DEF-Sensor.
4. Measure resistance between CN30 ① and ④ for Ambient-Sensor.
5. Compare the above values with current temps of Sensoer locations and Part Spec in Manual and evalute them.





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